

## **Transcranial Infrared Laser Stimulation in Mild Cognitive Impairment**

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Recent neuroimaging studies indicate that chronic brain hypoperfusion (CBH) occurs in the posterior cingulate cortex, precuneus and temporoparietal cortex long before dyscognitive symptoms, amyloid-beta accumulation and cortical atrophy appear in Alzheimer's disease (AD). Studies have indicated these and other hypometabolic brain regions participate very early in the pre-clinical pathophysiology of AD and may trigger disruption of functional connectivity seen in this dementia. Consistent with the data of diminished cerebral perfusion and hypometabolism are parallel findings of progressive cognitive impairment prior to AD. If CBH is a key element in the early development of AD, then interventions that prevent or delay neuronal hypometabolism may be a therapeutic target in patients at high risk of AD, such as individuals with mild cognitive impairment (MCI). Transcranial infrared laser stimulation (TILS) offers a non-invasive approach to raise neurometabolic energy levels that can improve cerebral hemodynamics and cognitive function in humans. TILS may work by increasing mitochondrial cytochrome-c-oxidase to boost neuronal ATP production and energy capacity. Preliminary studies in older adults with subjective memory complaints have shown that using TILS aimed at the prefrontal cortex significantly improved memory tasks compared to a placebo group. We will shortly begin a randomized preliminary study on MCI patients to determine TILS efficacy, safety and ability to stabilize or improve cognitive function.